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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/051,229

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Terry M. Turpin

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EXAMINER

BELLO, AGUSTIN

ART UNIT

PAPER NUMBER

2633

DATE MAILED: 12/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/051,229

Applicant(s)

TURPIN ET AL.

Examiner

Agustin Bello

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>5/20/02 & 6/19/03</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 5-7, 9-32 are rejected under 35 U.S.C. 102(e) as being anticipated by Shirasaki (U.S. Patent No. 6,185,040).

Regarding claims 1, 3, 5, 9, 11, 13, Shirasaki teaches a transmitting system comprising: a processor (reference numeral 206 in Figure 16) to process at least one collimated input beam (e.g. output of collimator 322a in Figure 16) which has been modulated with a data signal (column 1 lines 55-57 and column 11 lines 21-22) to produce multiple time-delayed output beams (inherent delay caused by element 206 in Figure 16, also shown in Figure 7), the multiple time-delayed output beams being spatially distributed (column 4 lines 1-5) and independently phase shifted (column 9 lines 46-47); an integration lens (reference numeral 322b in Figure 16) to receive the phase modulated output beams and to reintegrate the phase modulated output beams into a single encoded beam with a time series chip sequence, and an optical fiber (reference numeral 318 in Figure 16) to receive the integrated encoded beam from the integration lens and to transmit the integrated encoded beam.

Regarding claims 2, 6, 7, 10, 12, 14, Shirasaki teaches a receiving system comprising: a processor (reference numeral 206 lower in Figure 16) to process the encoded collimated light

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beams received from a transmitter to produce multiple time-delayed output beams (inherent delay caused by element 206 in Figure 16, also shown in Figure 7), the multiple time- delayed output beams being spatially distributed (column 4 lines 1-5) and independently phase shifted (column 9 lines 46-47); an integration lens (reference numeral 322b in Figure 16) to receive the phase-shifted output beams and to reintegrate the phase-shifted output beams into a single decoded beam; and a photo detector (column 11 lines 52-56) to receive the integrated decoded beam and to generate an output.

Regarding claims 15-20, Shirasaki teaches that the modulation can be implemented in the spectral domain (e.g. each optical signal is shifted in phase with respect to each adjacent wavelength).

Regarding claims 21-26, Shirasaki's structure can be used as an optical equalizer.

Regarding claims 27-32, Shirasaki's structure can be used in a wide-band signal generation.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki.

Regarding claims 4 and 8, Shirasaki differs from the claimed invention in that Shirasaki fails to specifically teach that the optical tapped delay device includes an etched plate having an etch depth sufficient to produce a desired phase shift though the time delayed output beams.

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However, etched plates for producing phase shifts in optical communication signals are well known in the art. One skilled in the art would have been motivated to employ an etched plate in the device of Shirasaki in order to produce a more pronounced phase shift in the signals output from the device. Moreover, Shirasaki's disclosure of a block structure that could have any suitable shape would have suggested an etched plate to one skilled in the art. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ an etched plate in the device of Shirasaki.

5. Claims 33-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki in view of Ranalli (U.S. Patent No. 6,285,500).

Regarding claims 33, 36, Shirasaki teaches an optical tapped delay line device having a cavity to process at least one collimated input beam to produce multiple time delayed spatially distributed output beams in a linear array (as discussed above in the rejection of claim 1) and a two-dimensional photo detector array (reference numeral 118 in Figures 11 and 12) arranged to sample the interfering beams. Shirasaki differs from the claimed invention in that Shirasaki fails to specifically teach a second input beam which projects at an angle to a plane of the optical tapped delay line linear array to interfere with each optical tapped delay line beam or an electronic amplifier to sample the photodetector array. However, Ranalli, in the same field of optics, teaches that it is well known to introduce a second beam to an optical system and allow the beams to interfere with a first set of delayed beams (see Figure 5). One skilled in the art would have been motivated to do so in order to reduce crosstalk and achieve greater optical performance (see abstract of Ranalli). Furthermore, electrical amplifiers for sampling photodetector arrays are well known in the art and readily available. Therefore, it would have

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been obvious to one skilled in the art at the time the invention was made to introduce a second input beam which projects at an angle to a plane of the optical tapped delay line linear array to interfere with each optical tapped delay line beam as well as electrical amplifiers for sampling the photodetector array.

Regarding claim 34, the combination of references teaches that the optical tapped delay line input beam is modulated with a data signal (as discussed in claim 1) and the second input beam is a coherent reference (inherent in the use of laser light in both systems).

Regarding claim 35, the combination of references teaches that the optical tapped delay line input beam is a coherent reference (inherent in the use of laser light in Shirasaki) and the second input beam is modulated with a data signal (column 7 lines 54-61 of Ranalli).

Regarding claims 37, the combination of references teaches that output beam to output beam delays propagate in a same direction (as seen in Figure 5 of Ranalli) in the optical tapped delay line device and the second optical tapped delay line device and an output of the receiving system is a correlation of the signals on the input beams.

Regarding claim 38, the combination of references differs from the claimed invention in that it fails to specifically teach that the output beam to output beam delays propagate in opposite directions in the optical tapped delay line device and the second optical tapped delay line device, and an output of the receiving system is a convolution of the signals on the input beams.

However, one skilled in the art would clearly have recognized that it would have been possible to arrange the propagation of output beam delays in a number of different configurations, including one in which the output beam delays propagate in opposite directions in the optical tapped delay line device and the second optical tapped delay line device, hence providing a convolution of the

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input signals. One skilled in the art would have been motivated to do so in order to further mix the first and second signals due to interference. Moreover, Ranalli clearly suggests convolution in the mixture of signals produced by the device. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to allow the output beam to output beam delays that propagate in opposite directions in the optical tapped delay line device and the second optical tapped delay line device, thereby producing an output of the receiving system which is a convolution of the signals on the input beams.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (571) 272-3026. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571)272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AB



**AGUSTIN BELLO
PATENT EXAMINER**